

What is claimed is:

1. A method for modifying a surface of a solid material, comprising:
carrying out a silicatizing treatment on the surface of the solid material by wholly or partially blowing a flame of a fuel gas that contains a silicon-containing compound having a flash point of 0 to 100°C and a boiling point of 105 to 250°C onto the surface of the solid material.
2. The method according to claim 1, wherein
the silicon-containing compound has at least one of a nitrogen atom, a halogen atom, a vinyl group, and an amino group in molecule or on a terminal of the molecule.
3. The method according to claim 1, wherein
the silicon-containing compound is selected from the group consisting of hexamethyldisilazane, vinyltrimethoxysilane, vinyltriethoxysilane, trifluoropropyl trimethoxysilane, trifluoropropyl trichlorosilane, 3-aminopropyl trimethoxysilane, 3-aminopropyl triethoxysilane, and 3-chloropropyl trimethoxysilane, which is used independently or in combination of two or more of them.
4. The method according to claim 1, wherein

the silicon-containing compound is a mixture of a silicon-containing compound containing a nitrogen atom and a halogen atom in molecule with a silicon-containing compound containing a vinyl group or an amino group on the terminal of the molecule.

5. The method according to claim 1, further comprising:

adding an alcohol compound to the silicon-containing compound, wherein the amount of the alcohol compound added is in the range of 0.01 to 30 mol% when the total amount of the silicon-containing compound is defined as 100 mol%.

6. The method according to claim 1, wherein

the content of the silicon-containing compound in the fuel gas is in the range of 1×10^{-10} to 10 mol% when the total amount of the fuel gas is defined as 100 mol%.

7. The method according to claim 1, wherein

the silicon-containing compound is in a vapor-liquid equilibrium state, and

a gaseous part of the silicon-containing compound is mixed in the fuel gas and then combusted.

8. The method according to claim 1, further comprising:

a UV-curing step as a step subsequent to the step of modifying

the surface of the solid material, wherein

a coating film made of UV-curing paint is formed on a surface-modified solid material.

9. The method according to claim 8, wherein,

in a cross-cut adhesion test in accordance with JIS K-5400, the number of pieces of the coating film made of any of epoxyacrylate-based UV-curing paint, urethaneacrylate-based UV-curing paint, and polyesteracrylate-based UV-curing paint, which are peeled off from their corresponding grids, is 10 or less per 100 grids.

10. A surface-modified solid material, having a wetting index of 40 to 80 dyn/cm (measured at 25°C) obtained by carrying out a silicatizing flame treatment on a surface of a solid material by wholly or partially blowing a flame of a fuel gas that contains a silicon-containing compound having a flash point of 0 to 100°C and a boiling point of 105 to 250°C onto the surface of the solid material.

11. The surface-modified solid material according to claim 10, wherein

the wetting index of the solid material before the surface treatment is in the range of 20 to 45 dyn/cm (measured at 25°C).

12. The surface-modified solid material according to claim 10, wherein a coating film made of UV-curing paint is formed on the surface-modified material.